

What is claimed is:

- 5 1. A filament coating apparatus comprising:  
a frame for releasably securing a filament;  
a carriage mounted on said frame to oscillate between a first position and a  
second position;

- 10 a first filament holding fixture mounted on said carriage;  
a second filament holding fixture mounted on said carriage in axial  
alignment with said first filament holding fixture to secure a measured filament portion  
including a bare portion thereof, located inside a first boundary and a second boundary,  
between said first filament holding fixture and said second filament holding fixture;  
at least one spray head attached to said frame at said first position;  
15 at least one radiation source attached to said frame at said second position,  
said measured filament portion moving between said spray head and said radiation source,  
during oscillation of said carriage between said first position and said second position to  
place said bare portion to receive a curable coating composition from said spray head, for  
application from said first boundary to said second boundary, and thereafter to cure said  
20 curable coating by exposure to radiation from said radiation source.

2. The filament coating apparatus of claim 1, wherein the filament is an optical fiber.

3. An apparatus for coating a filament comprising:

- 25 a filament organizer having an extended filament between a lockable spool  
and a rotary spool, said extended filament having a measured filament portion and a bare  
filament portion;

- a frame adapted for releasable connection to said filament organizer;  
at least one spray head attached to said frame;  
30 at least one radiation source attached to said frame, said filament organizer  
having adjustable movement over a distance equal to the length of said measured portion  
to position at least said bare portion of said filament for applying a curable coating

composition thereto by said spray head and thereafter to cure said curable coating composition by exposure to radiation from said radiation source.

4. The apparatus of claim 3, wherein said filament organizer further includes a support having a first surface opposite a second surface and at least a pair of through holes, said lockable spool and said rotary spool being attached adjacent to said first surface.

5. The apparatus of claim 4, wherein said frame further includes a carriage movably mounted on said frame for adjustable oscillatory movement in said distance, said carriage including at least a pair of studs for releasably mating with said at least a pair of through holes of said support to position said filament organizer on said carriage, to align said extended filament for application of said curable coating by said spray head and curing of said curable coating by said radiation source.

6. The apparatus of claim 5 wherein said carriage has a first arrangement to place said filament organizer at a first angle to said spray head and said radiation source, said carriage further has a second arrangement to place said filament organizer at a second angle to said spray head and said radiation source such that said filament organizer transitions between said first angle and said second angle for coating around the circumference of a filament.

7. The apparatus of claim 3 including a plurality of spray heads and radiation sources to apply and cure said curable coating composition to cover the surface around the circumference of a filament.

8. The apparatus of claim 3 wherein said spray head is an ink jet spray head.

9. The apparatus of claim 3 wherein said spray head is an ultrasonic atomizer spray head.

10. The apparatus of claim 9 wherein said ultrasonic atomizer spray head includes a deflector for changing the direction of droplets released from said ultrasonic atomizer spray head.

11. The apparatus of claim 10 wherein said deflector is an air knife deflector including  
5 an air entry and an air exit slot that provides an air stream for changing the direction of droplets released from said ultrasonic atomizer spray head.

12. The apparatus of claim 3 wherein said curable coating composition is curable in the presence of oxygen.

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13. The apparatus of claim 12 wherein said curable coating composition is a 100% solids, ionically curable composition.

14. A method of recoating a bare portion of a filament comprising the steps of:

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providing a filament organizer having an extended filament between a fixed spool and a rotary spool, said extended filament having a measured filament portion and a bare filament portion;

releasably attaching said filament organizer to a frame of a filament recoating apparatus;

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applying a curable coating composition to said bare portion from at least one spray head attached to said frame to provide a recoated filament portion;

moving said filament organizer to change the position of said recoated filament portion from said spray head to said radiation source to cure said curable coating composition to radiation from said radiation source;

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repeatedly applying and curing said curable coating composition sufficient to produce a substantially uniform coated layer over said extended filament.

15. The method of claim 14 wherein repeatedly applying and curing said curable coating composition includes from about 5 to about 50 applications such that each said  
30 application adds from about 2 microns to about 100 microns to the thickness of a filament.

16. The method of claim 14 wherein said curable coating composition has a viscosity from about 40centipoise to about 900centipoise.
17. The method of claim 14 wherein said curable coating composition has a viscosity  
5 from about 40centipoise to about 400centipoise.
18. The method of claim 14 wherein said curable coating composition has a viscosity from about 40centipoise to about 200centipoise.
- 10 19. A method of recoating a bare portion of a filament comprising the steps of:  
providing a filament organizer having an extended filament between a fixed spool and a rotary spool, said extended filament having a measured filament portion and a bare filament portion;  
releasably attaching said filament organizer to a frame of a filament  
15 recoating apparatus;  
applying a first curable coating composition to said bare portion from at least one spray head attached to said frame to provide a recoated filament portion;  
moving said filament organizer to change the position of said recoated filament portion from said spray head to said radiation source to cure said first curable  
20 coating composition by radiation from said radiation source  
applying a second curable coating composition to said recoated filament portion to provide an overcoated filament portion; and  
moving said filament organizer to change the position of said overcoated filament portion from said spray head to said radiation source to cure said curable coating  
25 composition by radiation from said radiation source.